

# Malaysian Smart Factory 4.0

## Information Technology Fundamental

Hands On  
Industry  
4.0

### Overview

Smart Factory takes current manufacturing processes to Industry 4.0 standards; highly agile, efficient and automated production lines capable of data generation and collation. Combined with analytics and machine learning, the factory of the future will have predictive and prescriptive capabilities, contributing to higher productivity & boundless innovation.

The Malaysian Smart Factory (MSF) 4.0 program @ SHRDC offers smart factory competency training through hands-on and online/remote learning approaches, ideal for relevant skillset and talent development towards an Industry 4.0 ready workforce in Malaysia.

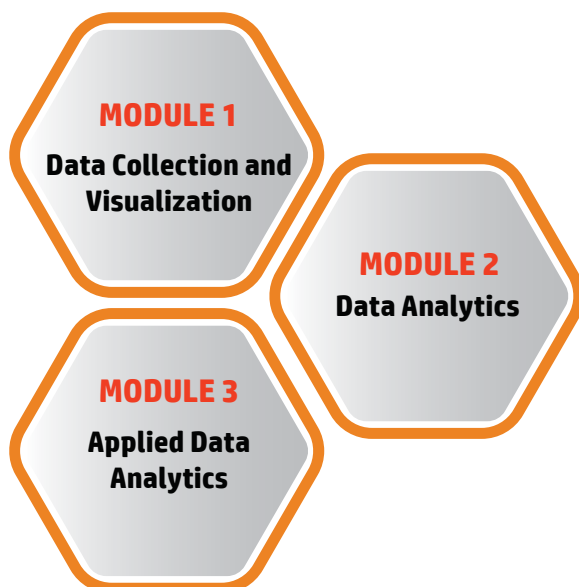
**Target audience:** Engineers, technicians, technical managers, IT/ERP support teams, academia with relevant background.

**Pre-Requisite:** Computer science / mathematics / statistics / analytics / engineering

### Training Methodology:

Participants are exposed to theoretical fundamentals and demonstrations of information technology related to smart factory competencies and processes, followed by hands-on and remote learning activities to support application of competencies acquired.

### Training Modules:



### Total Duration:

26 Days (2 days/13 weeks)

### Venue:

SHRDC Training Centre Shah Alam

### Cost per program:

RM17,967 (HRDF SBL/SBL KHAS Claimable)

### Cost per module:

RM5,989 (HRDF SBL/SBL KHAS Claimable)

*Cost fee is inclusive 6% SST*

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## Module 1 Data Collection and Visualization

8 Days  
9 am – 5 pm

- ▶ Overview of Data Collection and Visualization
- ▶ IoT-Gateway setup, Node-Red programming, and real-time data visualization
- ▶ On-premise data storage using MySQL
- ▶ Cloud service data storage using Altair SmartCore
- ▶ Cloud service data visualization using Altair SmartSight
- ▶ Project and Assessment

### Upon completing this module, participants will be able to:

- ✔ Learn and apply basic knowledge, techniques and tools to transfer data from an Operational Technology (OT) network to the Information Technology (IT) network.
- ✔ Learn and apply basic knowledge, techniques and tools in data collection and visualization.
- ✔ Store OT sensor data with timestamp into and retrieve OT sensor data from an on-premise target system (such as MySQL DB) using Node-Red programming
- ✔ Store OT sensor data with synchronized timestamp into and retrieve data from a cloud service data storage platform (such as Altair SmartCore) using Node-Red, MQTT protocol and/or REST API
- ✔ Use Node-Red to visualize OT sensor historical data from an on-premise target system (MySQL DB), and real-time data from a PLC based system in an OT network
- ✔ Use a cloud service visualization platform (such as Altair SmartSight) to create dashboard(s) that displays OT sensor historical that are sourced from an on-premise target system (such as MySQL), or display real-time data using MQTT communication protocol.

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## Module 2 Data Analytics

9 Days  
9 am – 5 pm

- ▶ Overview of Machine Learning and Data Mining Process
- ▶ Data Exploration
- ▶ Overview of Machine Learning Algorithm
- ▶ Decision Tree & important variables
- ▶ Production Quality Prediction and Dashboard (Visualization)
- ▶ Overfitting and Feature Reduction
- ▶ Overview of Machine Learning Platform Tools and Platforms
- ▶ Project and Assessment

**Upon completing this module, participants will be able to:**

- ✓ Learn and apply basic knowledge, techniques and tools in machine learning.
- ✓ Learn and apply machine algorithms: Linear Regression, Decision Trees, Random Forest, K-means, etc.
- ✓ Learn and apply data exploration: Correlation, Accuracy Measurements, Model Evaluation, etc.
- ✓ Use a data analytic tool to do data exploration, clean and prepare, create a model and visualize the useful information from a dataset.
- ✓ Through a series of lab tutorial to explore, clean the data, identify important variables in a dataset, create and evaluate a suitable model, discover overfitting, score or make a prediction.
- ✓ Get an overview of Machine Learning Tools and Platforms (example: Dataiku and Python).

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**Module 3  
Applied Data Analytics**

- ▶ Applied analytics in real world
- ▶ Preparing the training data
- ▶ Prediction and visualization
- ▶ Case study exercises (Lab sessions)
- ▶ Data science project and cost matrix
- ▶ Challenge project on a sample real world production line
- ▶ Project and Assessment

**Upon completing this module, participants will be able to:**

- ✓ Be introduced to real world data analytics case studies and examples.
- ✓ Examine and evaluate real world data analytics in their workplace through a project.
- ✓ Through a series of lab sessions, learn how to handle data science project from manufacturing examples.
- ✓ Apply critical thinking for solving specific data science problem or question.
- ✓ Complete a challenge project involving an RFID production line, discussion with engineers, creating a prototype model and making a prediction of a given objective.

**9 Days  
9 am – 5 pm**

**MSF 4.0 is a SHRDC partnership with the Swiss Smart Factory  
delivering hands-on experience and talents for the future of manufacturing**



**SHRDC**

**For more information please contact:** +603 5513 3560 [info@shrdc.org.my](mailto:info@shrdc.org.my)

**Selangor Human Resource Development Centre**

No 1, Ground Floor, Block 2, Pusat Perniagaan Worldwide (Worldwide Business Park),  
Jalan Tinju 13/50, Section 13, 40100 Shah Alam, Selangor Darul Ehsan, Malaysia.

**tel.** +603 5513 3560 **fax.** +603 5513 3490 **email.** [info@shrdc.org.my](mailto:info@shrdc.org.my) [www.shrdc.org.my](http://www.shrdc.org.my)